

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Rule 53(b) Divisional Application of
U.S. Serial No. 09/407,304

Applicant: **Yoshimi TOCHISHITA, et al.**

Serial No.: **Not Yet Assigned**

Group Art Unit: **1762 (prior)**

Filed: **June 19, 2001**

Examiner: **T. Meeks (prior)**

For: **SURFACE-TREATING SUPPORT MEMBER AND METHOD USING THE SAME
(As amended)**

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Date: June 19, 2001

Sir:

Prior to calculation of the filing fee and examination of this application, please amend the
above-identified application as follows:

IN THE TITLE:

Please amend the title to read:

—SURFACE-TREATING SUPPORT MEMBER AND METHOD USING THE
SAME—.

IN THE ABSTRACT:

Please substitute the attached Abstract of the Disclosure.

IN THE SPECIFICATION:

Please amend the specification as follows:

Please replace the paragraph beginning at page 1, line 6, with the following rewritten paragraph:

The present invention relates to a surface treating process, and in particular, a surface treating process for forming a deposited film of a metal such as aluminum, zinc and tin, or a metal nitride such as titanium nitride on the surface of a sintered product such as, for example, a rare earth metal-based magnet liable to be oxidized, and the like, thereby ensuring that the sintered product such as the rare earth metal-based magnet has an oxidation resistance.

Please replace the paragraph beginning at page 2, line 12, with the following rewritten paragraph:

In the above conventional surface treating process, however, the substantially uniform vapor-deposition can be performed certainly. However, because the works are piled one on another within the cage-like container, it cannot be avoided that some deposition nonuniformity is produced. Therefore, it has been desired to propose a surface treating process by which a further uniform surface treatment can be performed. Many of rare earth metal-based magnet articles such as Nd-Fe-B based magnet articles, for example, resulting from the processing treatment, are rectangular parallelepiped, hard and moreover, have sharp corners. For this reason, the following problem is arisen: The corners collide with one another during the vapor deposition treatment, whereby the deposited film on the surface is peeled off and in a severe case, the corners of a product are chipped, resulting in a poor yield. Particularly, in a case of a large-sized article, there is a problem that the

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weight is large, and the collision energy is large, resulting in an extremely reduced yield. In a case of a work having an inside diameter portion and having a shape such as a ring-like shape and the like, there is a disadvantage that the inside diameter side of the work is occluded by the other work and for this reason, the uniform surface treatment of the inside diameter side cannot be achieved successfully.

Please replace the paragraph beginning at page 7, line 16, with the following rewritten paragraph:

In addition, by winding the entanglement preventing spring around that portion of the wire which forms the side face of the tubular structure, the wires forming the holders can be prevented from entering a clearance defined between both of the wires, whereby the entanglement of the wires forming the holders with one another is prevented.

Please replace the paragraph beginning at page 12, line 19, with the following rewritten paragraph:

Thus, by such uniform surface treatment of the works in the spaced-apart states, a film of a soft metal such as aluminum, tin and zinc or a hard metal nitride such as titanium nitride can be deposited uniformly even on a hard and brittle sintered article.

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Please replace the paragraph beginning at page 15, line 21, with the following rewritten paragraph:

According to a thirty eighth aspect and feature of the present invention, there is provided a surface treating apparatus, comprising a treating material source provided within a treating chamber, so that a treating material released from the treating material source is delivered to reach works for a surface treatment, and a means for rotating a support member supporting the works about a rotational axis.

Please replace the paragraph beginning at page 16, line 5, with the following rewritten paragraph:

According to a fortieth aspect and feature of the present invention, there is provided a surface treating apparatus, comprising a treating material source provided with in a treating chamber, so that a treating material released from the treating material source is delivered to reach works for a surface treatment, and a means for rotating a support member supporting the works about its axis and about a rotational axis.

IN THE CLAIMS:

Please cancel claims 1-45 without prejudice or disclaimer.

Please add new claims 46-52 as follows:

46. (New) A surface-treating support member for supporting a plurality of works, comprising an upper cage and a lower cage including a plurality of compartments, so that the cages are openable and closable in a lengthwise direction.

47. (New) A process for surface-treating a plurality of works comprising the step of surface-treating the works in a treating chamber, while rotating the works about their axes in spaced apart states, wherein said rotation of the works is conducted with the works supported by a support member rotated about its axes, said support member comprising an upper cage and a lower cage including a plurality of compartments, so that the cages are openable and closable in a lengthwise direction.

48. (New) A process for surface-treating a plurality of works according to claim 47, wherein said surface treatment is a vapor deposition on a sintered article.

49. (New) A process for surface-treating a plurality of works, comprising the step of surface-treating the works, while rotating them about a rotational axis in spaced-apart states, wherein said rotation of the works is carried out with the works supported by a support member rotated about a rotational axis, the support member comprising an upper cage and a lower cage including a plurality of compartments, so that the cages are openable and closable in a lengthwise direction.

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50. (New) A process for surface-treating a plurality of works according to claim 49, wherein said surface treatment is a vapor deposition on a sintered article.

51. (New) A process for surface-treating a plurality of works, comprising the step of surface-treating the works, while rotating them about their axes and about a rotational axis in spaced-apart states, wherein said rotation of the works about the rotational axis is carried out with the works supported by a support member, the support member comprising an upper cage and a lower cage including a plurality of compartments, so that the cages are openable and closable in a lengthwise direction.

52. (New) A process for surface-treating a plurality of works according to claim 51, wherein said surface treatment is a vapor deposition on a sintered article.

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REMARKS

Claims 46-52 are pending. Prompt and favorable action on the merits is earnestly solicited.

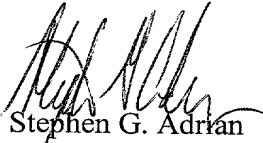
A marked-up version of the amendments to the specification is attached and entitled "VERSION WITH MARKINGS TO SHOW CHANGES MADE." Also attached is a substitute Abstract of the Disclosure.

Should the Examiner deem that any further action by applicant would be desirable to place the application in better condition for allowance, the Examiner is encouraged to telephone applicant's undersigned attorney.

In the event that any fees are due in connection with this paper, please charge our Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, WESTERMAN, HATTORI,
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Enclosures: Version with Markings to Show Changes Made
Substitute Abstract of the Disclosure
Information Disclosure Statement

VERSION WITH MARKINGS TO SHOW CHANGES MADE

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IN THE SPECIFICATION:

The paragraph beginning at page 1, line 6, has been amended as follows:

The present invention relates to a surface treating process, and in particular, a surface treating process for forming a deposited film of a metal such as aluminum, zinc and tin, or a metal nitride such as titanium nitride on the surface of a sintered product such as, for example, a rare earth metal-based magnet liable to be oxidized, and the like, thereby ensuring that the sintered product such as the rare earth metal-based magnet has [a] an oxidation resistance.

The paragraph beginning at page 2, line 12, has been amended as follows:

In the above conventional surface treating process, however, the substantially uniform vapor-deposition can be performed certainly. However, because the works are piled one on another within the cage-like container, it cannot be avoided that some deposition nonuniformity is produced. Therefore, it has been desired to propose a surface treating process by which a further uniform surface treatment can be performed. Many of rare earth metal-based magnet articles such as Nd-Fe-B based magnet articles, for example, resulting from the processing treatment, are rectangular parallelepiped, hard and moreover, [has] have sharp corners. For this reason, the following problem is arisen: The corners collide with one another during the vapor deposition treatment, whereby the deposited film on the surface is peeled off and in a severe case, the corners of a product are chipped, resulting in a poor yield. Particularly, in a case of a large-sized article, there is a problem that the weight is large, and the collision energy is large, resulting in an extremely reduced yield. In a case

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of a work having an inside diameter portion and having a shape such as a ring-like shape and the like, there is a disadvantage that the inside diameter side of the work is occluded by the other work and for this reason, the uniform surface treatment of the inside diameter side cannot be achieved successfully.

The paragraph beginning at page 7, line 16, has been amended as follows:

In addition, by winding the entanglement preventing spring around [the] that portion of the wire which forms the side face of the tubular structure, the wires forming the holders can be prevented from entering a clearance defined between both of the wires, whereby the entanglement of the wires forming the holders with one another is prevented.

The paragraph beginning at page 12, line 19, has been amended as follows:

Thus, by such [the] uniform surface treatment of the works in the spaced-apart states, a film of a soft metal such as aluminum, tin and zinc or a hard metal nitride such as titanium nitride can be deposited uniformly even on a hard and brittle sintered article.

The paragraph beginning at page 15, line 21, has been amended as follows:

According to a thirty [eight] eighth aspect and feature of the present invention, there is provided a surface treating apparatus, comprising a treating material source provided within a treating chamber, so that a treating material released from the treating material source is delivered

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to reach works for a surface treatment, and a means for rotating a support member supporting the works about a rotational axis.

The paragraph beginning at page 16, line 5, has been amended as follows:

According to a [forty] fortieth aspect and feature of the present invention, there is provided a surface treating apparatus, comprising a treating material source provided with in a treating chamber, so that a treating material released from the treating material source is delivered to reach works for a surface treatment, and a means for rotating a support member supporting the works about its axis and about a rotational axis.

ABSTRACT OF THE DISCLOSURE

A surface-treating support member for supporting a plurality of works, including an upper cage and a lower cage including a plurality of compartments, so that the cages are openable and closeable in a lengthwise direction. A process for surface-treating a plurality of works rotates the works about their axes using the support member.

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